

A photograph of a space shuttle's payload bay in orbit. A satellite is being deployed from the bay. The satellite is a small, rectangular object with a yellow and black color scheme. The payload bay is filled with various equipment, including a large, white, rectangular object wrapped in clear plastic. The background is the blackness of space with the Earth's blue and white horizon visible in the bottom left corner.

# SMALL SATELLITE PROJECT OFFICE (SSPO)

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- It all begins with Science.....
- Support GSFC's science community
  - SmallSat's can achieve great science at minimal cost
  - SmallSat opportunities are plentiful
  - SmallSat's offer solutions to otherwise unaffordable science
- Small Satellite Project Office will support Goddard's SmallSat Missions
  - From concept through mission operations
  - Project management, engineering, and project support
    - In-house, collaborations, industry, academia

# CubeSats and SmallSats

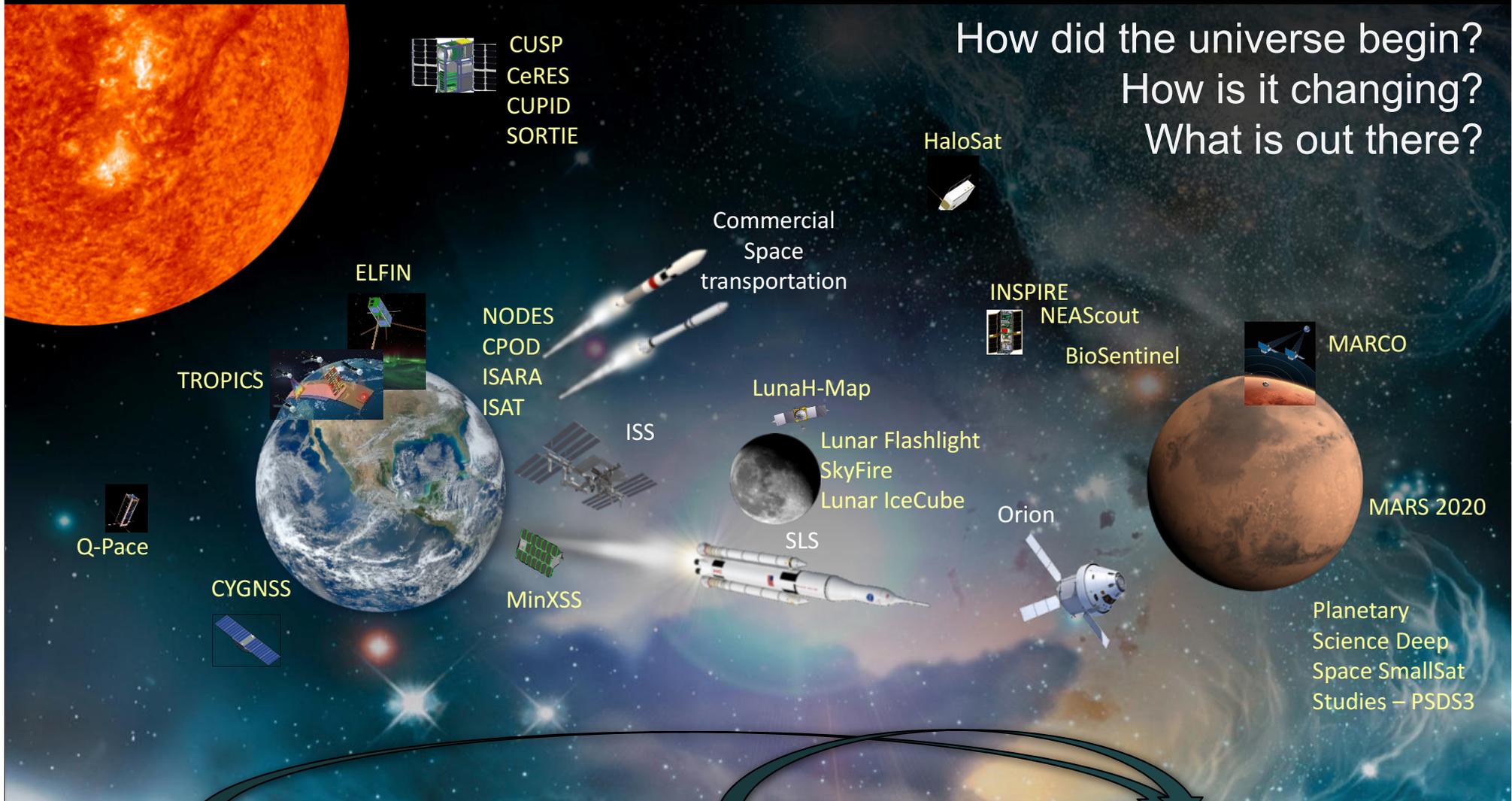
National Aeronautics and  
Space Administration



- CubeSats and SmallSats (C&S) and related technologies **enable innovative science and missions**
- The C&S market is **growing rapidly across all sectors** (civil government, business, universities, military)
- Goddard has the **broad scientific and engineering excellence** needed to successfully utilize C&S for NASA's mission
- Goddard has a **growing set of C&S activities**, ranging from individual CubeSats to proposals for constellations
- C&S are a key part of the future for Goddard and NASA, **among the full spectrum of platforms**
- **Many funding opportunities** are available (SMD, STMD, HEO, partnerships) for C&S science and technology
- Because Goddard is optimized to design and build **larger missions**, a **different organizational strategy** is needed for success with C&S at Goddard

# NASA is Enabling the Community's use of SmallSats to Help Answer Humanity's Big Questions

How did the universe begin?  
How is it changing?  
What is out there?



## NASA Technology:

- SSTP technology investments
- Formation Flight, Propulsion
- Communications, ACS systems

## NASA Exploration:

- Access to Space, SKGs
- CubeSat Launch Initiative
- SLS/Orion/Commercial

## NASA Science:

- SmallSats in all solicitations
- Leveraging STMD technologies
- Augmenting Larger Missions



## The SSPO will provide:

- Unified awareness of technical capabilities (technologies, labs, etc.)
  - Cross-campus collaboration to leverage complementary strengths.
  - Flexibility of technical, management, and risk approach
    - “Less than Class D”: “portfolio is successful”, individual missions bear known risks
  - Structural evolution needed to support a reasonable C&S portfolio
  - Partnerships with other Centers, Agencies, and Industry
  - Built- in vibrancy and renewal in its supporting workforce
  - Focus and external visibility for Goddard’s C&S science and technology efforts
  - Low-cost, quick-response solutions for proposers and partners.
  - Proactive pursuit of collaborations and opportunities
  - Cultural shift, a robust CubeSat/SmallSat culture will spread and benefit all GSFC endeavors
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- Past example is migration of Special Payloads Division personnel into larger 400 and 500 organizations 15 years ago

**All** will enable strong in-house capability in supporting Goddard-targeted science

# ORGANIZATIONAL OBJECTIVES

National Aeronautics and  
Space Administration



- Support Goddard's Science Community
- Enable success of current missions
- Achieve excellence in SmallSats
- Reduce fractionated support of SmallSats
- Understand the strengths and shortcomings of available COTS components
- Meet challenging budget and schedule constraints
- Minimize response time in a fast paced and rapidly changing environment
- Identify technology gaps that need to be addressed
- Enhanced technical knowledge, expertise, and experience
- Improvement of processes for future missions
- Establish a unified set of SmallSat processes and control measures
- Win new work and proposals

# WHY GSFC? Because No One Does Science Better

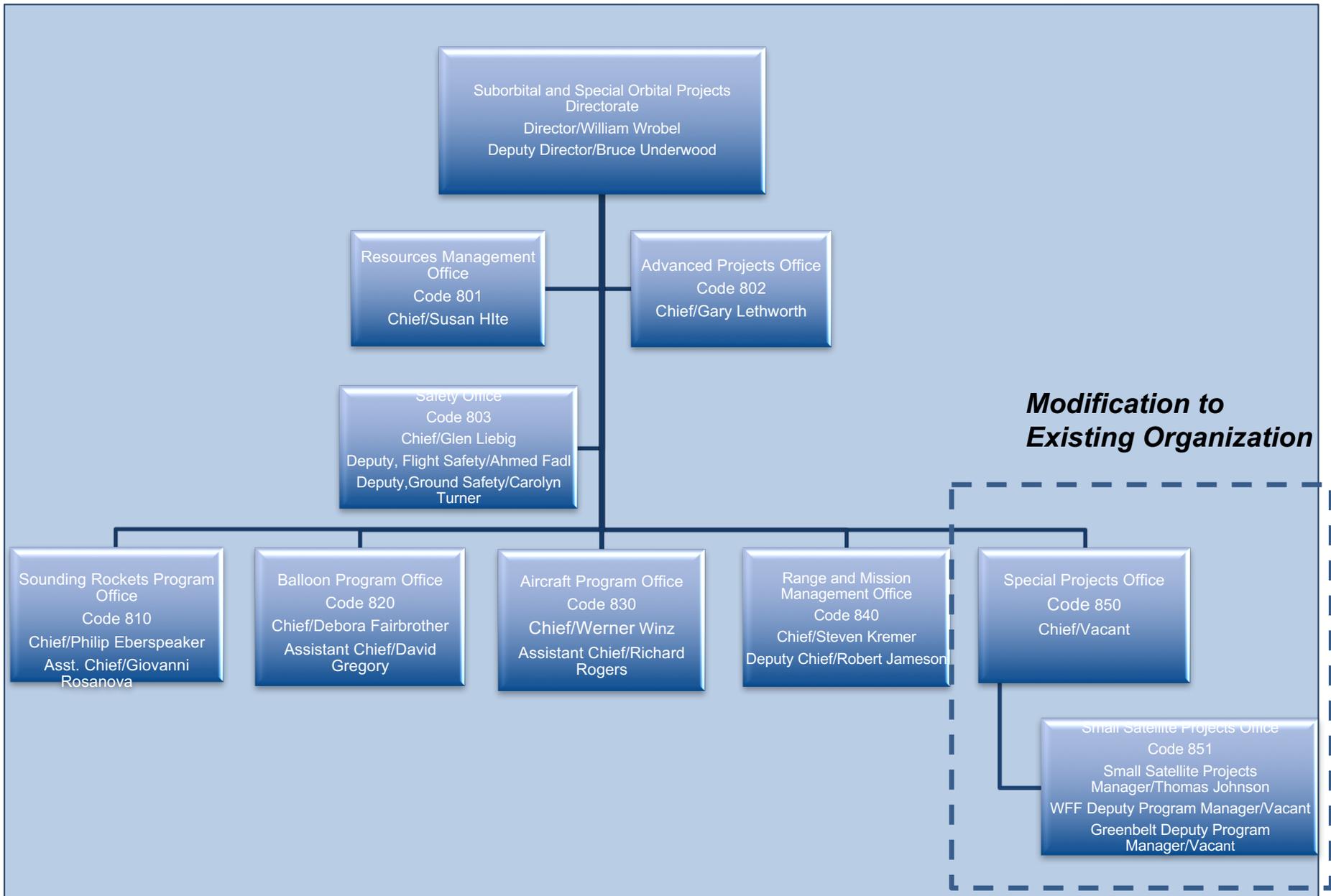


- Science, enabled by missions, is what NASA asks of Goddard, and what Goddard achieves
- C&Ss will enable more opportunities for scientific study
  - Tighter budgets mean more opportunity at the 'low end'
  - More missions are possible when small, fragmented, or constellation conops are considered

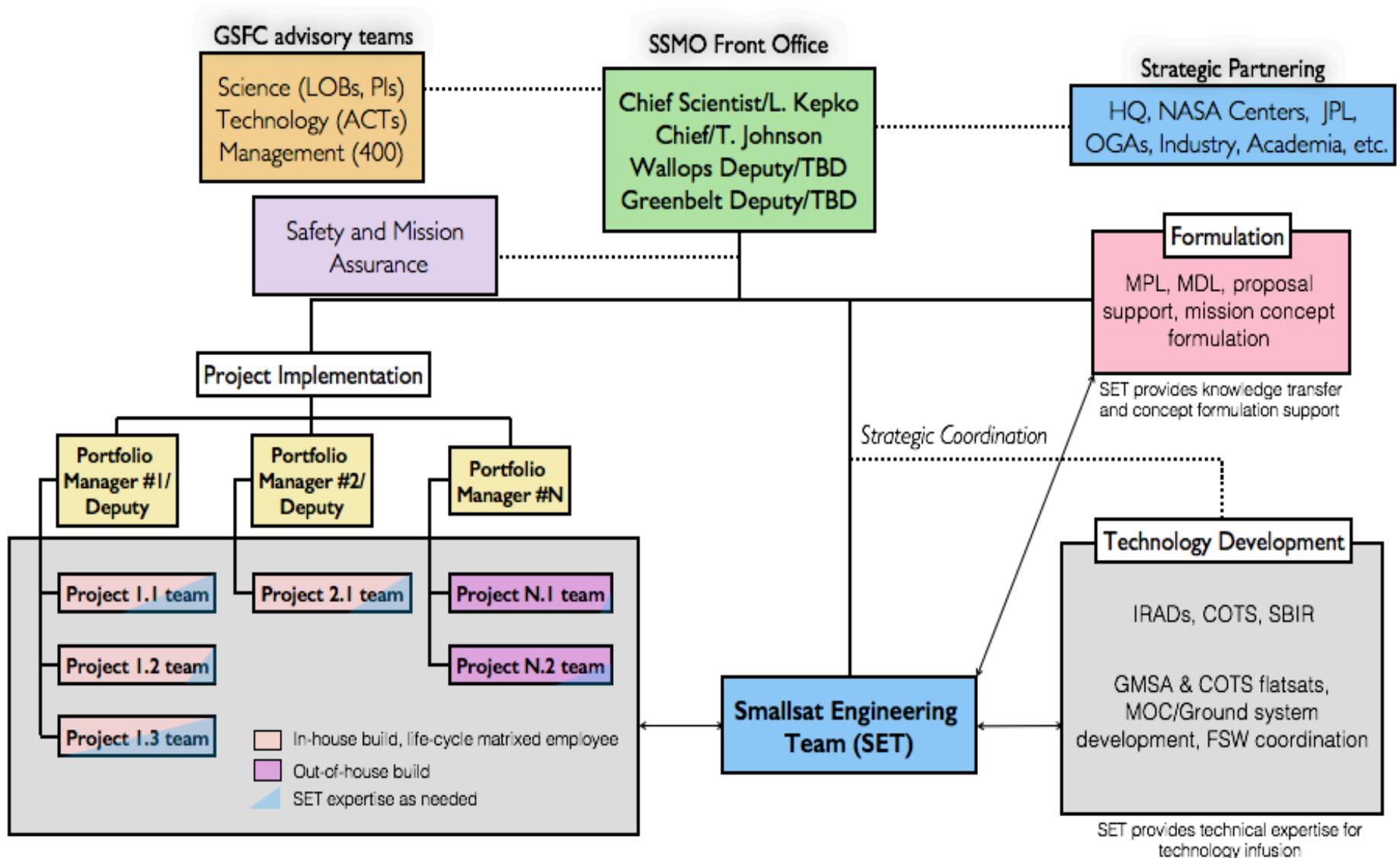
## And experience counts:

- Goddard has deep experience in the full continuum of missions, payloads, and instruments
  - From Sounding Rockets to Explorer-class to national flagship missions: (CLASP, IceCube, LDS, CATS, ISSCREAM, GEDI, MMS, JWST)
  - Each category involves increasing levels of reliability, quality, risk management, technical maturity, and visibility
- Goddard has deep experience in the “space” between the “high end” and the “low end”
  - Suborbital Experience: Portfolios of many Simultaneous Missions, Flexible Planning, Resource Sharing, Risk-Aware but Tolerant, Tailoring,
  - Shuttle and Station Experience: 100+ Get Away Special (GAS) payloads, 26 Hitchhiker missions, 73 payloads including 8 deployed SmallSats
  - SmallSat Experience: In-house Pegasus test spacecraft, 5 in-house SMEXs, ST-5 Constellation (3 'microsats')
  - Ongoing collaborations with many external agencies, universities, and organizations
- Goddard has deep experience in developing the technologies needed to solve C&S challenges
  - Collaborative / Constellation Operations
  - Radiation toleration
  - Communications technologies
  - Complete in-house spacecraft design, build, test, operate capability
  - Robust ongoing development of spacecraft technologies
  - Long history of collaboration with industry and academia on space flight missions

# SSOPD Organization



# SSPO – ORGANIZATION CHART





- Special Projects Office/850 Chief Position announcement closes tomorrow
- Position Descriptions completed for Deputy Project Managers (Greenbelt and Wallops)
  - Positions should be posted tomorrow, September 27
- Working with code 500 to assemble SmallSat Engineering Team

# SUMMARY

National Aeronautics and  
Space Administration



- CubeSats and SmallSats can achieve great science
- Number of CubeSats and SmallSats is expanding rapidly
- Goddard has the science and engineering excellence to excel in this rapidly expanding field
- An organizational approach will enable success
  - Start up of the SSPO is underway
- Small Satellite Project Office can support your planetary science mission – from concept through mission operations